

Grade 4 · Lines, Angles, Shapes and Symmetry

· Lesson

Common Core 4.G.A.1, 4.G.A.2, 4.G.A.3 · mathovore.fr

A line goes on forever both ways, a ray has one endpoint, and a line segment has two. Angles are right, acute or obtuse compared with a square corner. Parallel lines never meet, perpendicular lines make right angles, and a line of symmetry folds a figure into two matching halves.

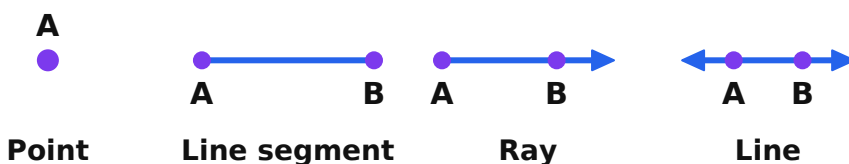
Grade 4 Common Core: 4.G.A.1 · 4.G.A.2 · 4.G.A.3

Key facts:

- A line segment has 2 endpoints, a ray has 1 and a line has 0.
- A right angle is a square corner; acute is smaller and obtuse is larger.
- Parallel lines never meet; perpendicular lines cross at right angles.
- A right triangle has exactly one right angle.
- A line of symmetry splits a figure into two matching halves.

What are points, lines, rays and line segments?

A **point** is an exact spot. Lines, rays and segments are made of points that line up.



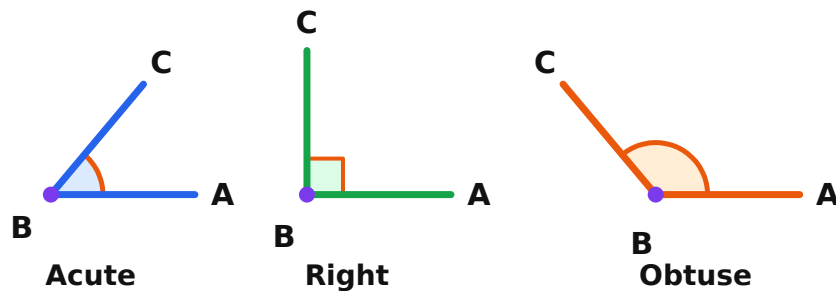
Four basic figures. Dots are points; arrows mean the figure keeps going.

Line, ray and line segment

A **line segment** has two endpoints and a length you can measure. A **ray** has one endpoint and goes on forever in one direction. A **line** has no endpoints and goes on forever both ways. We write the segment from A to B as $\overline{AB}$.

What are right, acute and obtuse angles?

An **angle** forms when two rays share an endpoint called the vertex. Compare every angle with a square corner, which is a **right angle**.

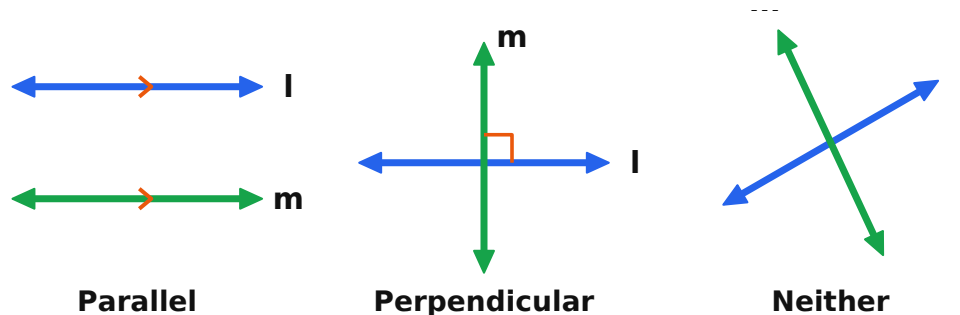


Compare every angle with the square corner.

- **Acute** angle: smaller than a right angle.
- **Right** angle: exactly a square corner, 90° .
- **Obtuse** angle: larger than a right angle but smaller than a straight line.

What are parallel and perpendicular lines?

Parallel lines stay the same distance apart and never meet. **Perpendicular** lines cross and make right angles. Lines that cross at a slant are neither.



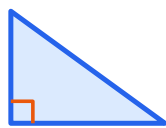
Parallel, perpendicular and neither.

How do you classify two-dimensional shapes?

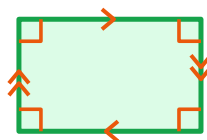
Sort shapes by their parallel sides and their right angles. A **right triangle** is a triangle with one right angle.

Shape	Pairs of parallel sides	Right angles
Right triangle	0	1
Rectangle	2	4
Parallelogram	2	0 (slanted sides)

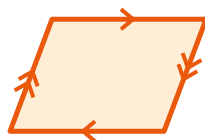
Shape	Pairs of parallel sides	Right angles
Trapezoid	exactly 1	0 or 2



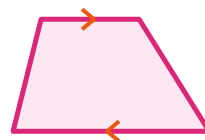
Right triangle



Rectangle



Parallelogram

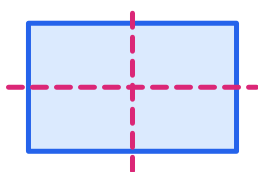


Trapezoid

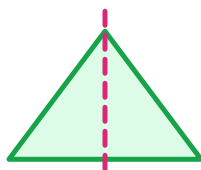
Orange squares mark right angles; matching arrow marks show parallel sides.

What is a line of symmetry?

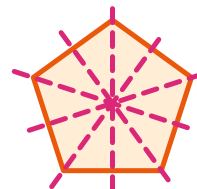
A **line of symmetry** is a fold line that makes two halves match exactly. A figure with at least one such line is *line symmetric*.



2 lines



1 line



5 lines

Dashed pink lines are lines of symmetry.

How to classify a figure

1. Count the sides.
2. Look for parallel sides.
3. Look for right angles.
4. Name the figure.

Example. A figure has 4 sides, 2 pairs of parallel sides and 4 right angles. It is a rectangle.

Lines, Angles, Shapes and Symmetry: frequently asked questions

What is the difference between a line, a ray and a line segment?

A line segment has two endpoints, a ray has one endpoint, and a line has none. Only a segment has a length you can measure.

How can you tell if an angle is acute, right or obtuse?

Compare it with a square corner. If it is smaller, it is acute. If it fits exactly, it is right. If it is wider but not a straight line, it is obtuse.

What is the difference between parallel and perpendicular lines?

Parallel lines never meet and stay the same distance apart. Perpendicular lines meet and form four right angles.

What is a right triangle?

A right triangle has exactly one right angle. The other two angles are acute, because a triangle cannot hold two angles of a square corner or more.

How do you find a line of symmetry?

Imagine folding the figure so the two halves land on each other. If every edge matches, the fold line is a line of symmetry.